Idea Exchange

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Activity Details

Activity Name Anhbiotics and Disinfectants vs. Backria

Targeted Grade Level(s) Grade 11

Subject or Topic area Biology - Microbiology

Catalyst 2003 Idea Exchange

Audience: **Biology 11**
Unit: **Microbiology**
PLO's covered:

- examine members of the Kingdom Monera and describe characteristics that unify them
- demonstrate sterile technique while preparing a streak plate
- evaluate the effectiveness of various antibiotics, disinfectants, and antiseptics on bacteria cultures
- explain processes by which bacteria adapt to become resistant to antibiotics (as an extension of the lab)

I can't say that I developed this from scratch, I believe that I have seen other labs similar to it, but don't have the original lab that I began adapting so I can't source it ... if it is yours I apologize and thank you.

As said above I have taken ideas from similar labs and adapted them into this lab format. All of the supplies are available from science supply companies. As far as bacteria cultures go, you can pick and choose the ones you would like to have the students test. The blank disks I refer to are similar to the antibiotic disks but don't have anything on them. I have tried using q-tips to apply disinfectants and it just makes a mess usually. And if they are using a liquid disinfectant (as most are) they should not totally soak the blank disks as the liquid will spread out on the agar and run.

I enjoy doing this lab after doing a lab where they grow bacteria that they have collected from areas of the school to show them all of the places that bacteria can be found. Then this lab gives them a sense of how well antibiotics/disinfectants can/can't work.

Hope this is useful.

Disinfectants and Antibiotics vs. Bacteria

Materials:

4 Petri Plates with nutrient agar
sterile inoculating loop
sterile forceps
grease pencil
cultures of *Sarcinia lutea* and *Serratia marcescens* on petri plates
3 disinfectants (brought from home)
3 antibiotics (penicillin, streptomycin, erythromycin)
3 blank discs

Procedure:

1. Divide the bottoms of the two Petri plates into four sections, labeling one of the plates with sections **1-4**, and the other plate label the four sections **a-d**. (see attached page, diagram 1)

2. Using a sterile innoculating loop, spread *Sarcinia lutea* on the both plates. Make sure that you cover most of the plate (watch teacher demonstration.)

3. Using the plate which is labeled **1-4**: apply 3 different antibiotic disks to each of sections **2-4**, leaving section **1** as a control.

4. Using the sterile tweezers apply some disinfectant to a blank disk and place the disinfectant disk on section **b** of the second plate. Repeat this step with the other two disinfectants for sections **c** and **d**. Leave section **a** as a control.

5. Repeat steps one to four with the other two plates and the *Serratia marcescens* culture.

6. Incubate the plates at approx. 37 degrees Celsius.

7. Observe the plates over the next three to four days and record your observations concerning the effectiveness of the antibiotics and disinfectants. The use of a table to record the results is recommended.

Discussion Questions

1. Which antibiotic was most effective for each of the cultures? What observations support this?

2. If you had an infection involving both *S. lutea* and *S. marcescens* which antibiotic would you suggest would best fight both of them off?

3. Check around the class to see if any groups had any cultures growing in areas where you did not. What could account for these occurrences? Why is this important and of concern?

4. Which disinfectant produced the greatest effect? Which observations support this?

5. By looking at the ingredients of the effective disinfectants, can you come up wiht a hypothesis about the ingredient(s) responsible for the disinfectants action?

6. In your opinion, do you think that the recent surge in antimicrobial products is warranted or is it just another way for these companies to make more money?

Diagram 1: Plate sections